

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. <b>PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.</b>					
1. REPORT DATE		2. REPORT TYPE Viewgraphs		3. DATES COVERED	
4. TITLE AND SUBTITLE  Ultrasonic Imaging of TTCP Samples				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)  William R. Davis				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)  Naval Air Warfare Center Aircraft Division 22347 Cedar Point Road, Unit #6 Patuxent River, Maryland 20670-1161				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT  Approved for public release; distribution is unlimited.					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			William R. Davis
Unclassified	Unclassified	Unclassified	SAR	15	19b. TELEPHONE NUMBER (include area code) (301) 342-3761

Standard Form 298 (Rev. 8-98)  
Prescribed by ANSI Std. Z39-18

DECLASSIFIED AND DECLASSIFIED 4

20001031 069



---

# *The Technical Cooperation Program (TTCP)*

## *Technical Panel Annual Meeting*

### *Materials Group TP-5*

#### *Evaluation of Samples Using Ultrasound Imaging*

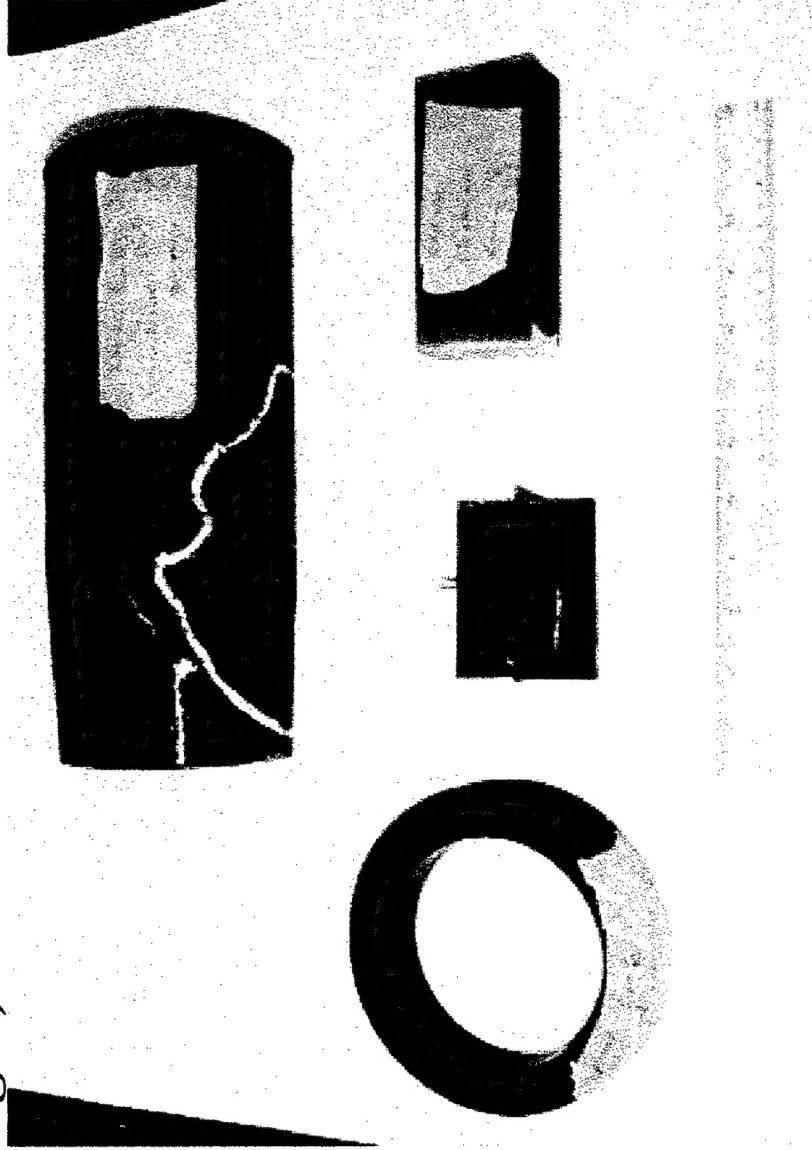
*William R. Davis*

*Dr. Ignacio Perez*

**16 - 20 October 2000**

## TCCP Sample Evaluation

RAH66 Quill Detector Face Drive Shaft (top), Quill Shaft  
(bottom left), small brace (bottom center), and flex beam  
(bottom right)

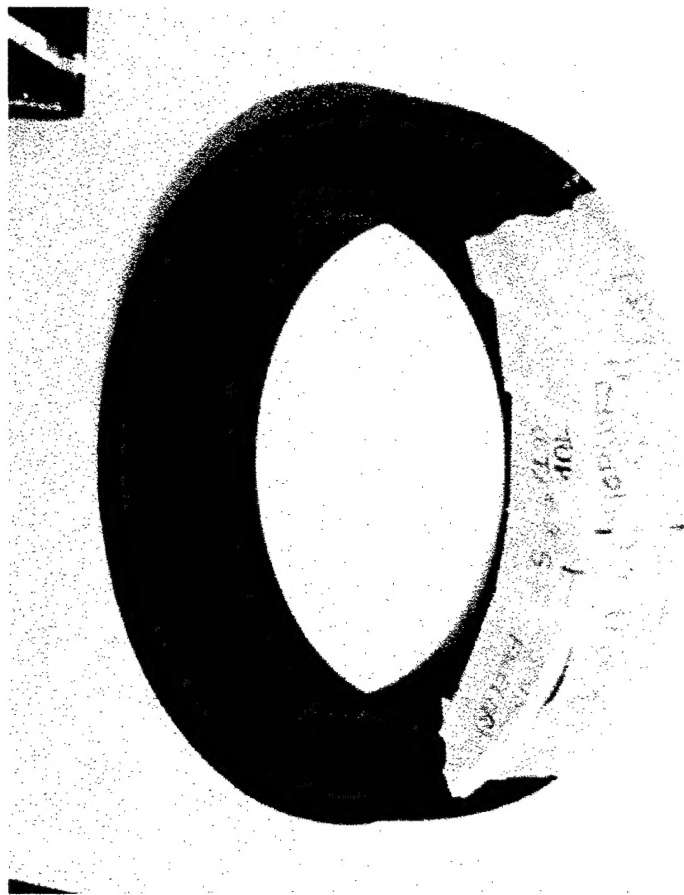




## TCCP Sample Evaluation



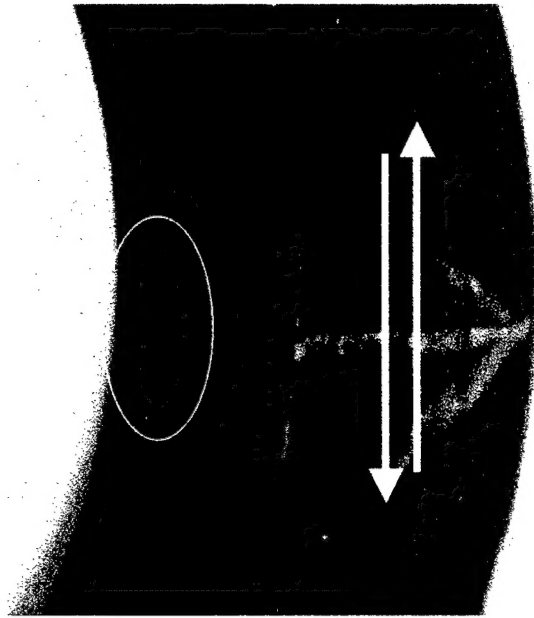
RAH 66 Quill Shaft 7/8" thick by 6" dia. By 1 1/8" high ring.



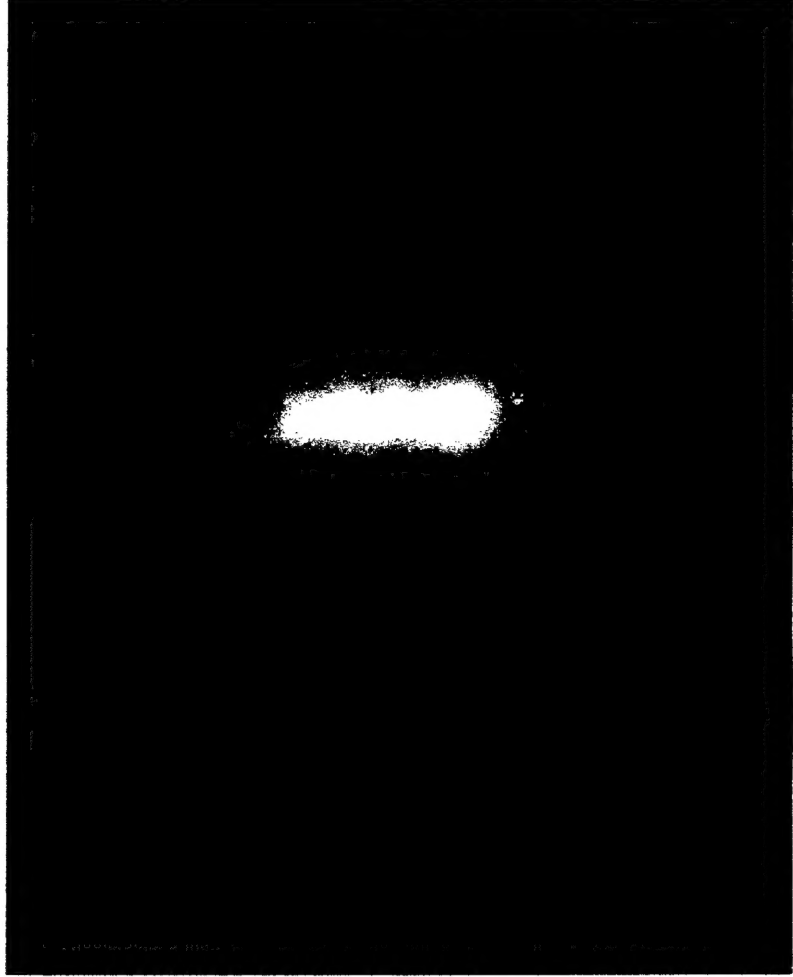


## TACP Sample Evaluation

RAH 66 Quill Shaft is a 7/8" thick by 6" diameter by 1 1/8" high ring. A 1 MHz 1.5" diameter transducer was used in through transmission mode. This shows a full height disbond 1/2" wide.



3 14 15 16 17 18





**TEAM**

## TQCP Sample Evaluation

**RESEARCH &  
ENGINEERING**

RAH66 Quill Detector Face (Dr) Shaft Examined by through transmission. Thickness is 1/2 inch to 1 inch. Height 12.5 inch, 5 3/4 inch diameter

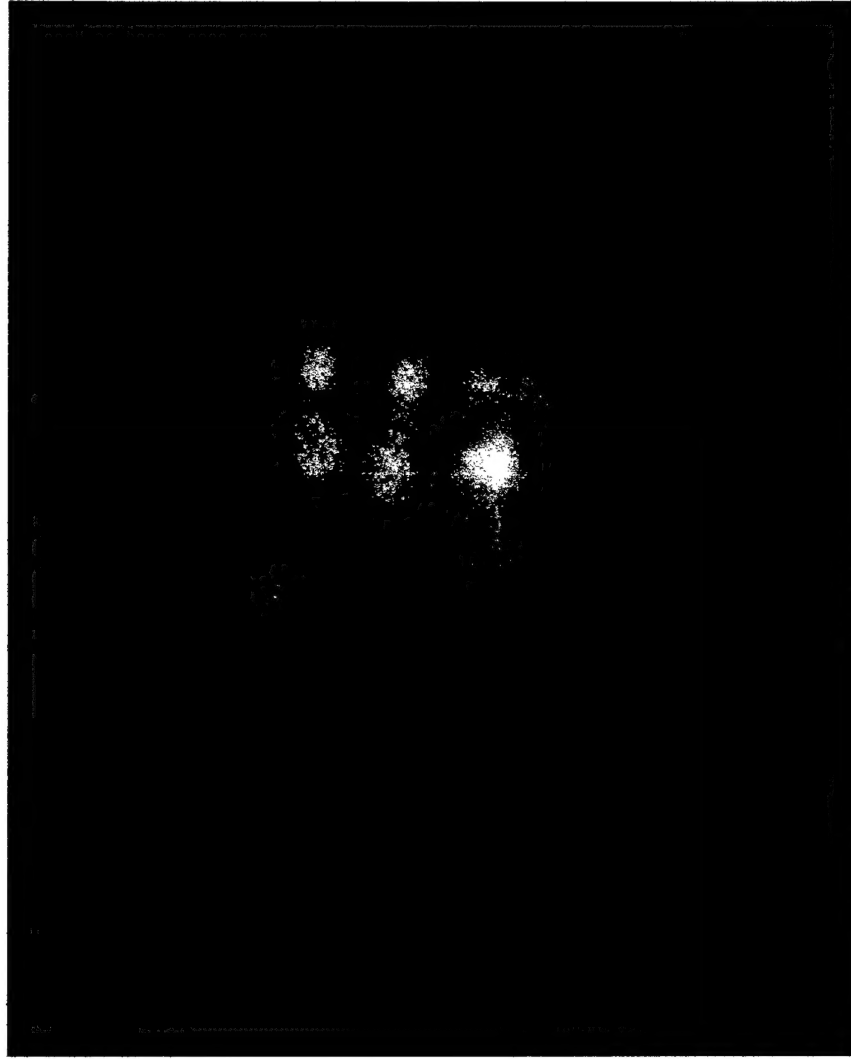
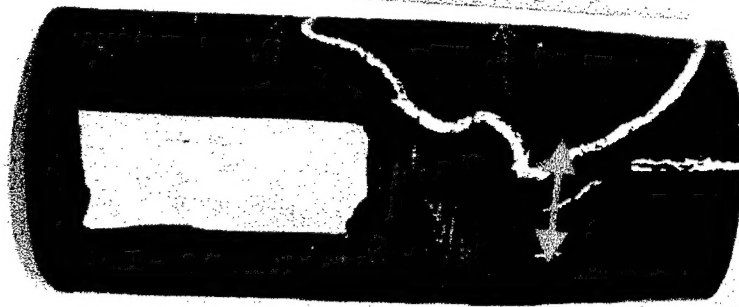




# TCCP Sample Evaluation



Quill Detector Face Bottom section –heavy thickness section  
examined by through transmission at 2.25 MHz

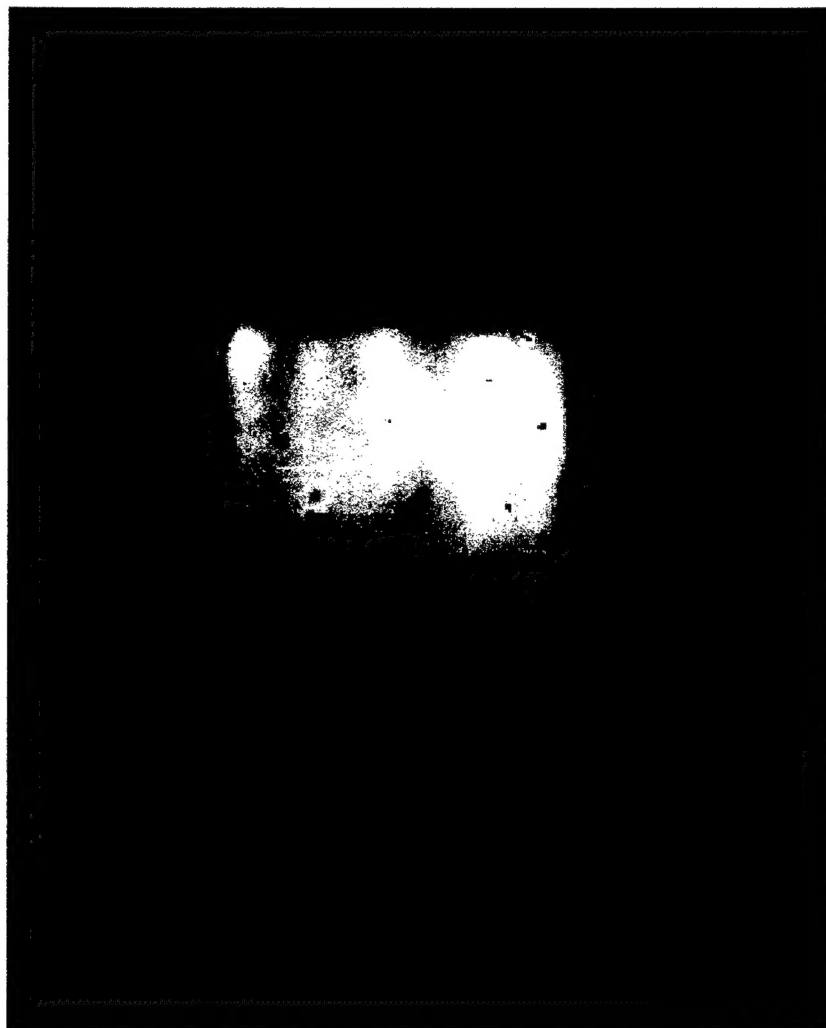
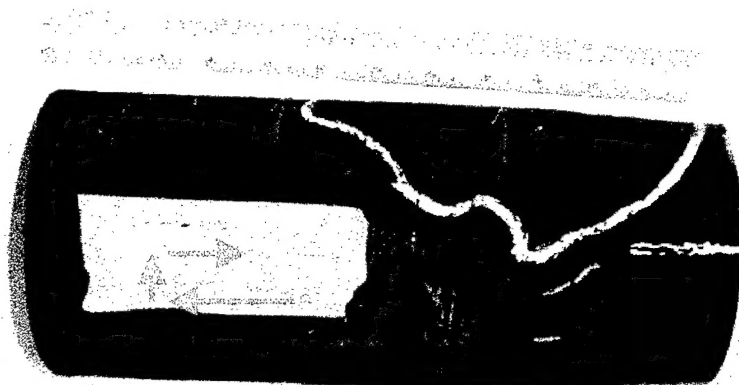




## TCCP Sample Evaluation



RAH66 Quill Detector Face (Dr) Shaft imaged using a 2.5 MHz  
1.5" diameter transducer in through transmission. The thin  
Top Section is approximately 0.625 inch thick.



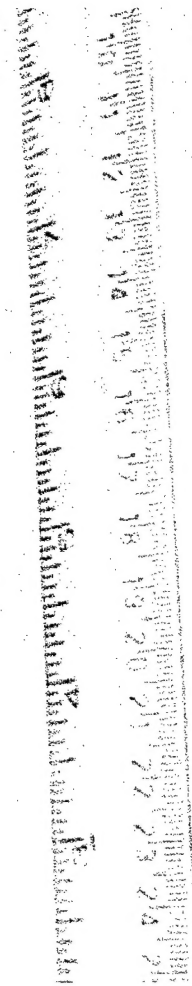
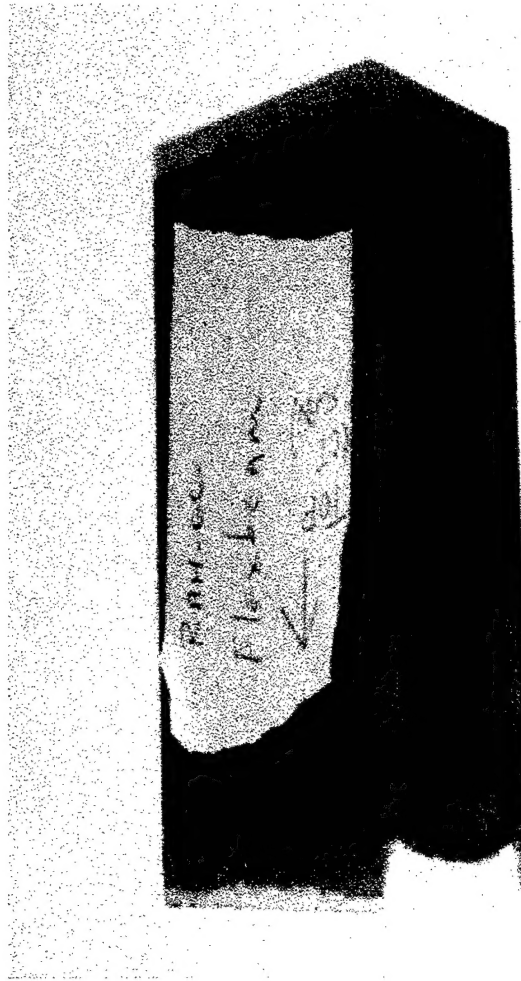




## TACP Sample Evaluation



The RAH66 Flex beam, 1.125" thick x 5.25" x 2.375"

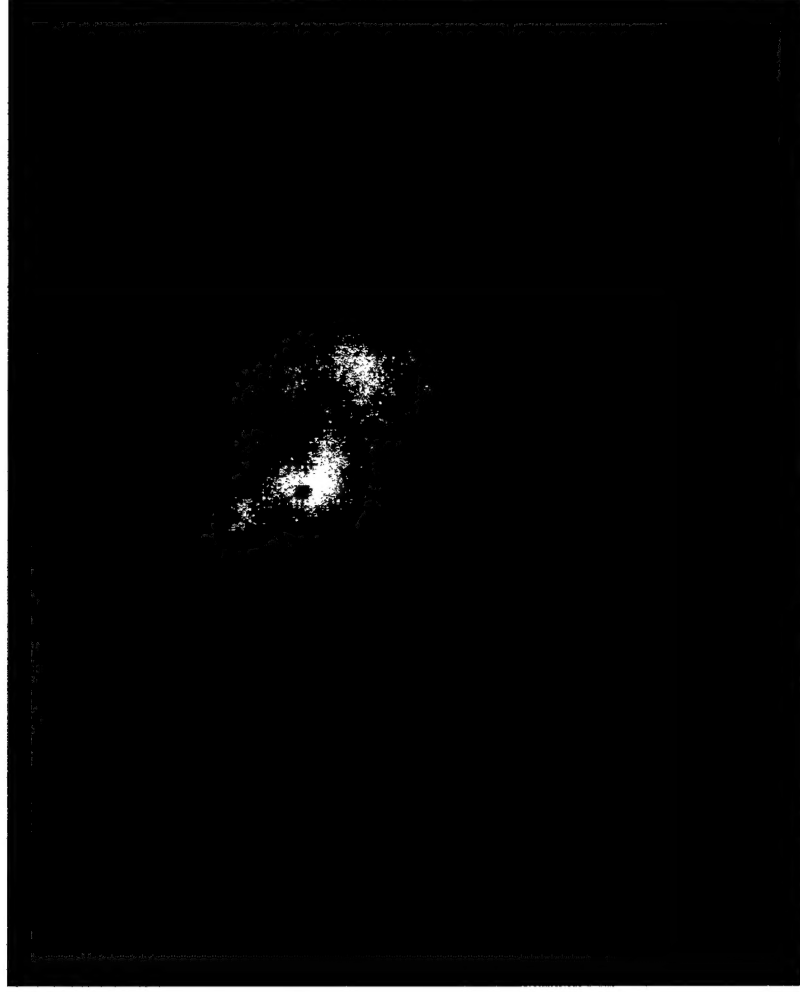
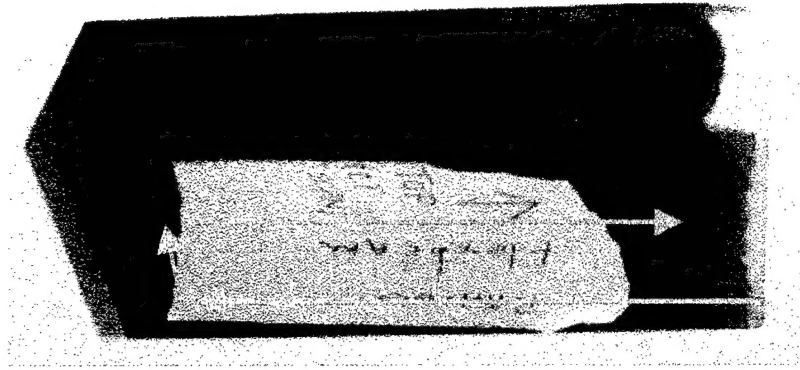




## TCCP Sample Evaluation



RAH66 Flexbeam imaged using Through Transmission at  
2.25 MHz shows a darker line of marceling near the top

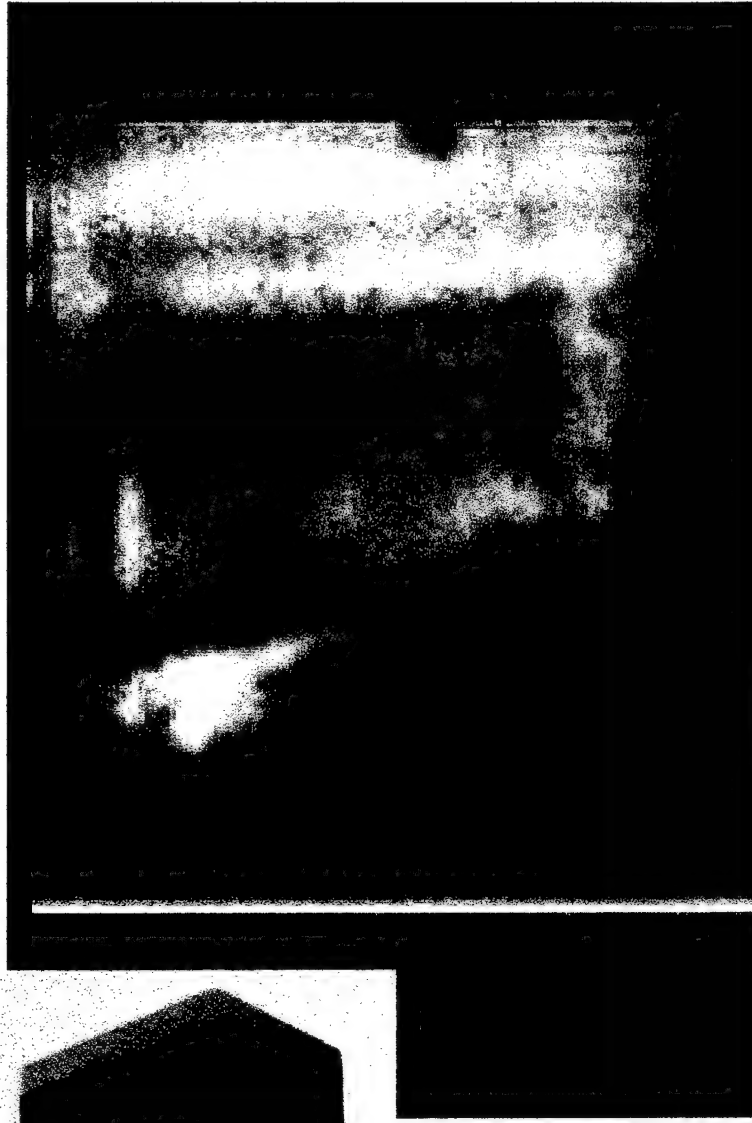
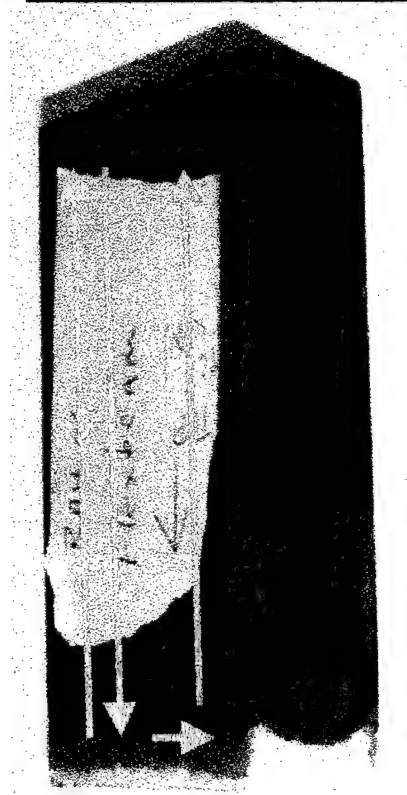




## TACP Sample Evaluation

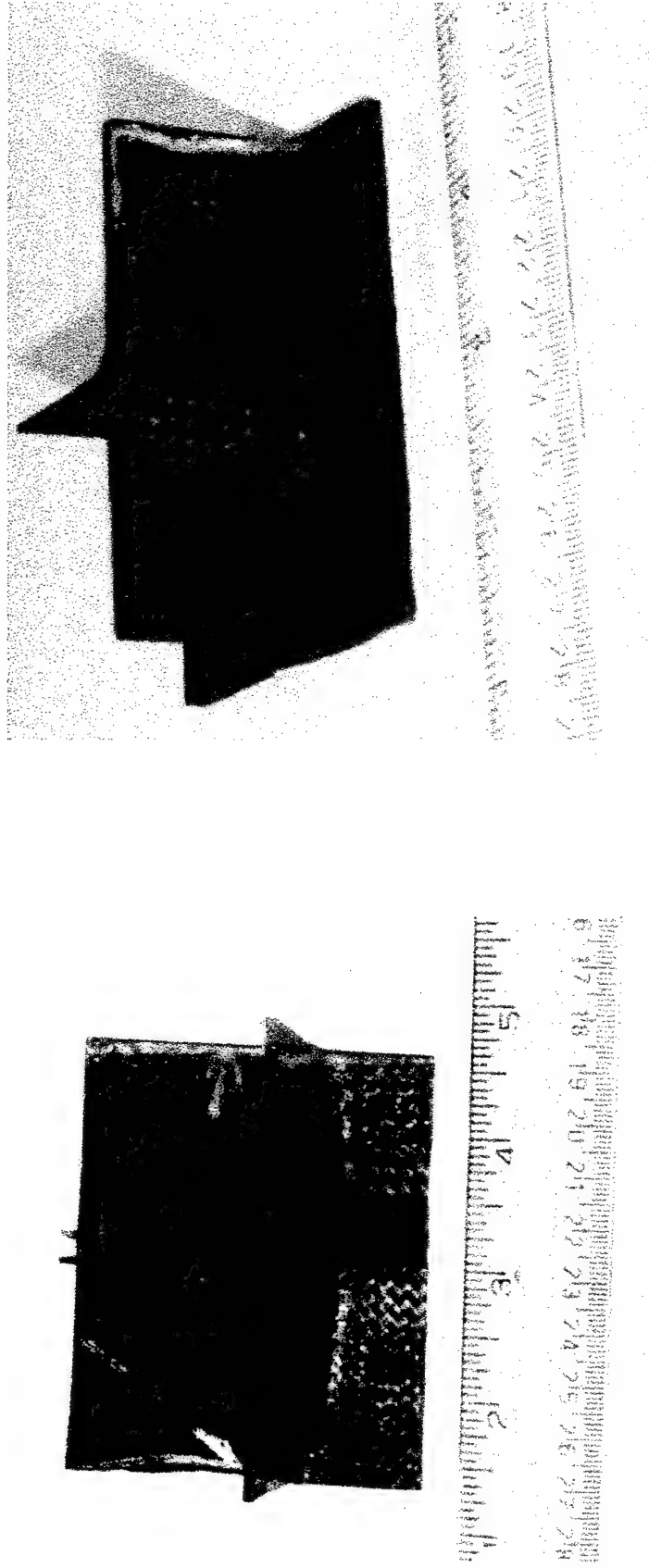


RAH66 Flex beam in tank. One sided imaging of the ultrasound by reflection shows some near surface discontinuities near the end of the flex beam.



# TTCP Sample Evaluation

## IAMT prepreg box, overhead and side views

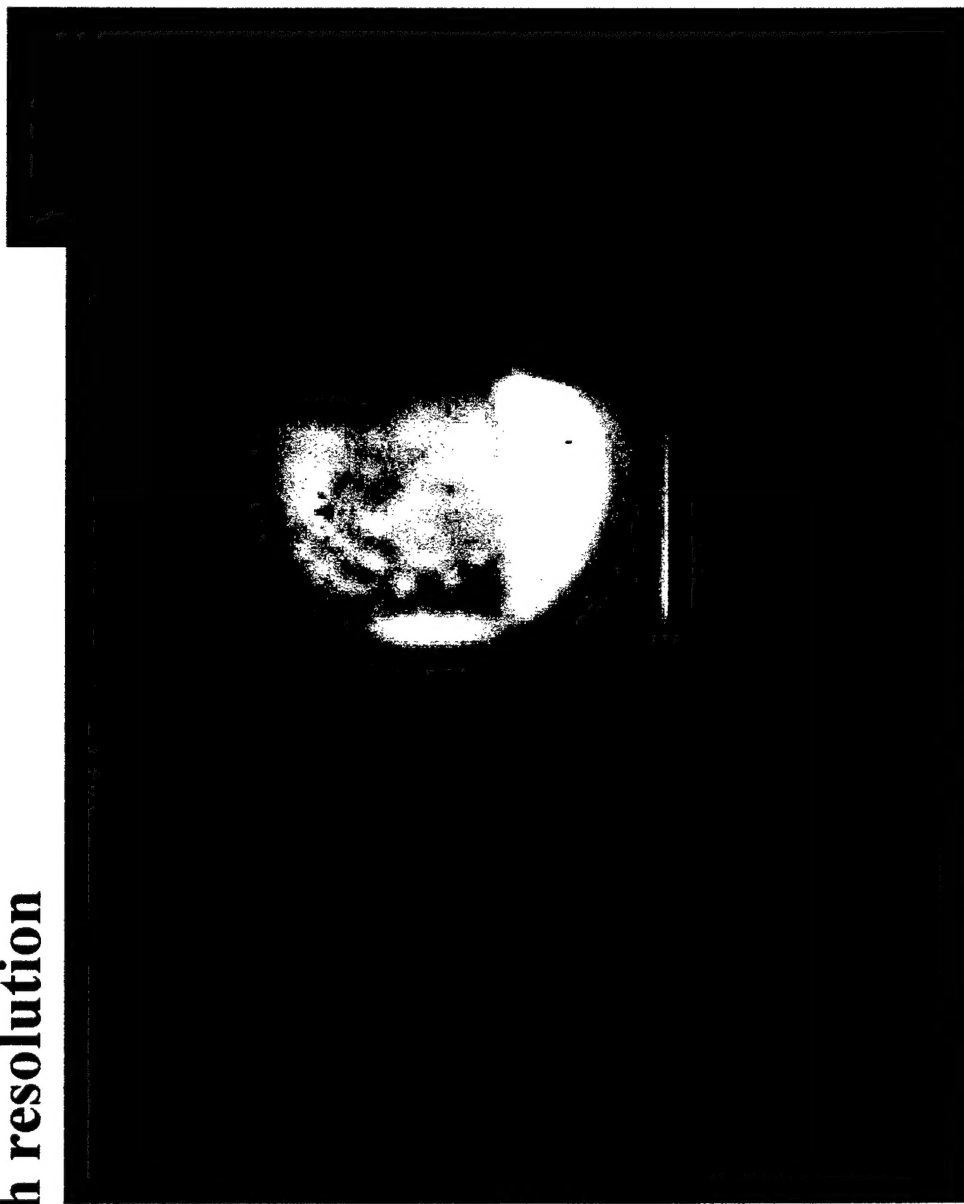
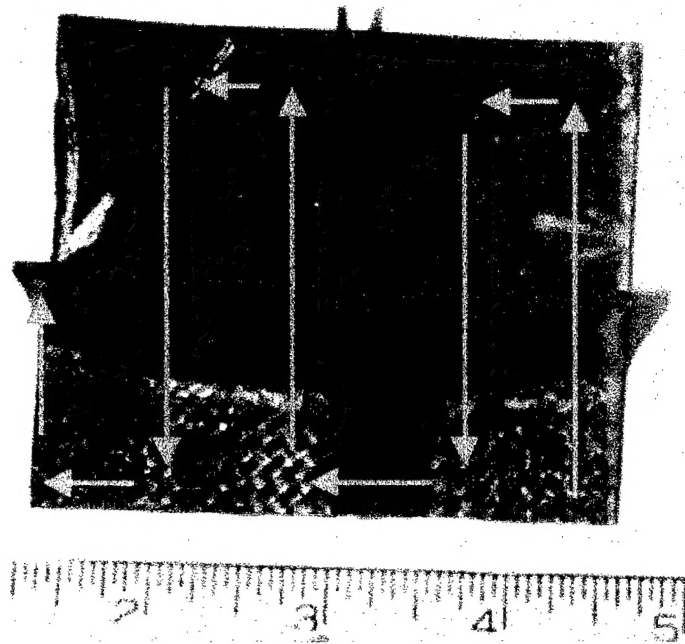




## TACP Sample Evaluation

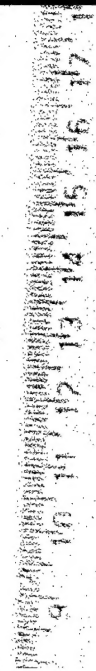
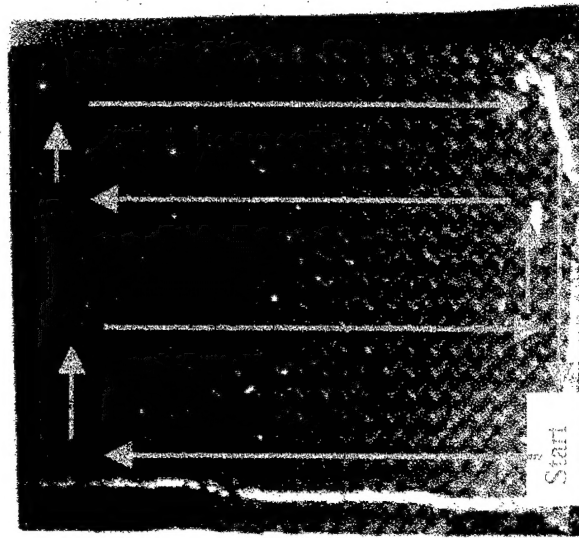


IAMT prepreg box imaged in through transmission  
using 5 MHz for high resolution



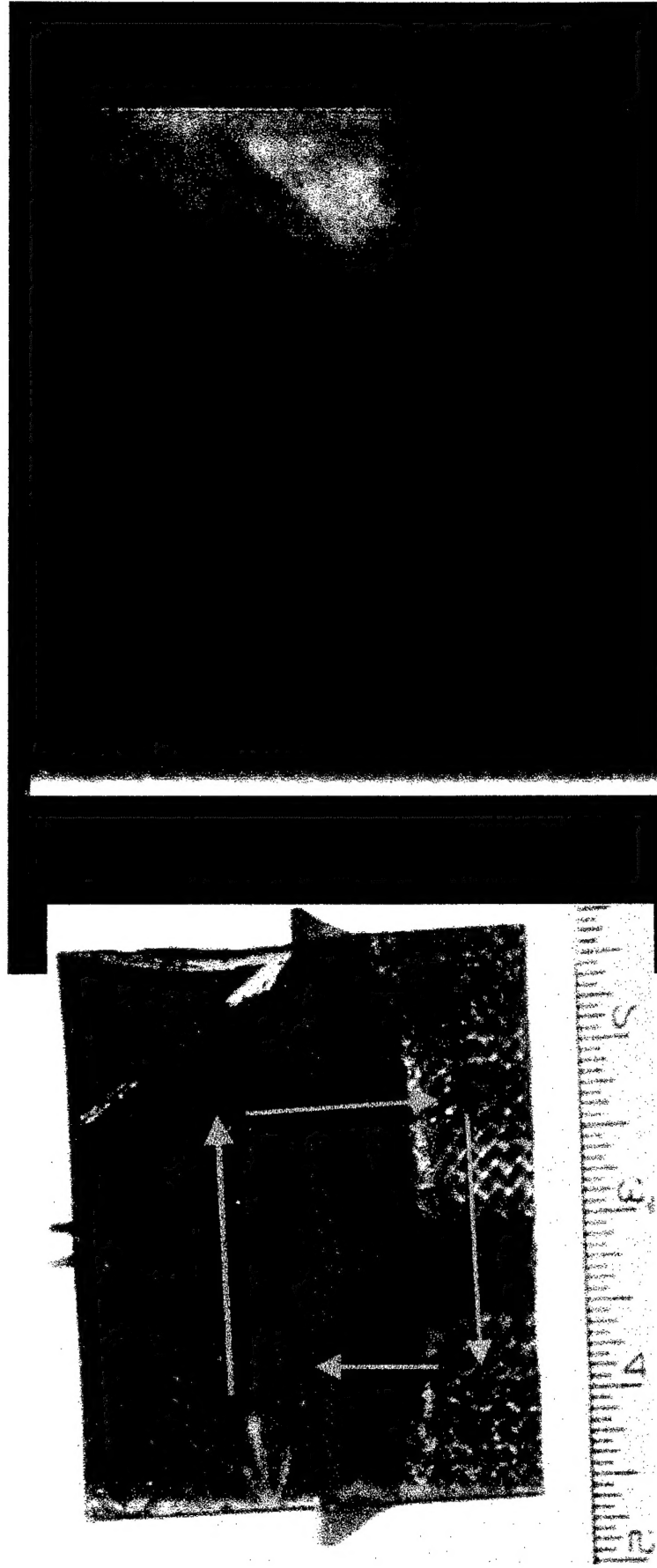
# TCCP Sample Evaluation

IAMT prepreg box imaged using the reflection camera in the tank. Back reflection imaging of the bottom of the part shows a discontinuity on one corner, and a surface discontinuity



## TACP Sample Evaluation

IAMT prepreg box imaged by reflection in the tank. Back reflection imaging with an increased time delay shows the triangular machined area and the 4 ribs



## TACP Sample Evaluation

3 cm thick balsa wood cored multilayer panel imaged  
using 5 MHz ultrasonic reflection camera in reflection

